

# HEAT SHRINK KITS, TUBING AND STAKON CONNECTORS



## Product Booklet

Heat shrink tubing is used to insulate electrical components, like wire, from external factors such as moisture, dust abrasion, and other objects which could cause damage. In water well applications, Boshart's heat shrink splice kits are used to make an underwater electrical connection between the leads on the pump motor and the pump cable.

How do you select a Heat Shrink Splice Kit? There are a number of things to consider. Visit our [Knowledge Base](#) to find articles that provide direction on how to choose the correct heat shrink kit for your application, a glossary of terms, and other additional resources.

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# HS1410 SERIES - HEAVY DUTY BLACK HEAT SHRINK SPLICE KIT (CSA & UL APPROVED)

## AWG #14 TO #10

### APPLICATIONS:

- Maximum reliability for insulating and protecting power cable connections and terminations.
- Commonly used in electrical, utility and industrial applications, designed for the new smaller O.D. motor lead wires being used on submersible pumps.
- Suitable for applications up to 600 volts.



### FEATURES:

- Seals and protects cable splices and terminations.
- Complete moisture sealing in submersed connections and environmental protection in underground connections.
- High impact, abrasion, corrosion and chemical resistance, highest level of mechanical durability.
- Flame retardant due to the carbon content (carbon black) in the CFW black tubing.

### SPECIFICATIONS:

- Made from CFW black heavy wall adhesive lined cross-linked polyolefin heat shrinkable tubing with a 3:1 shrink ratio.
- Tubing will shrink unrestricted to 33% of it's original diameter, the recovered wall thickness of the tubing is proportional to the degree of recovery.

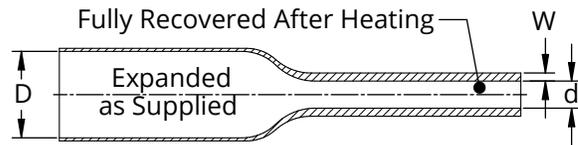
NOTE: Due to the substantial wall thickness, the tubing takes longer to shrink to it's fully recovered state; approx. 40-50 seconds. Time will vary depending on job site conditions and the heat source that is used.

### RATINGS:

- Continuous operating temperature -67°F to 230°F (-55°C to 110°C)
- Rated for 1 kV, 90°C continuous use
- Shrink temperature: 248°F (120°C)

### CERTIFICATIONS:

- Heat Shrink Tubes
  - CSA C22.2 No. 198.2-05; (065789\_0\_000)
  - UL 486D; (E132914)
- RoHS Certified Directive 2002/95/EC<0.10% Pb
- ANSI C119-1
- Western Underground Guide Numbers 2.4 and 2.5
- ICEA and NEMA insulation thickness requirements
- DNV Type approval
- See Page 14 for Stakon certification



### BLACK HD KITS (Long Stakons) - For #14, #12, & #10 AWG Pump Cable, Tubing: HST-HS1410-3-BK Tube length: 3" (76.2mm)

| Part No    | Expanded ID (D) |     | Recovered ID (d) |     | Recovered Wall Thickness (W) |     | No. of Shrink Tubes | Number of Stakons<br>Part No: SC-14-10 | Length of Stakon |       | Stakon Colour |        |
|------------|-----------------|-----|------------------|-----|------------------------------|-----|---------------------|--|------------------|-------|---------------|--------|
|            | in              | mm  | in               | mm  | in                           | mm  |                     |  | in               | mm    |               |        |
| HS1410-2   | 0.35            | 8.9 | 0.12             | 3.0 | 0.07                         | 1.8 | 2                   | 2 (#14 to #10)                         | 13/16            | 0.817 | 20.75         | Silver |
| HS1410-3   |                 |     |                  |     |                              |     | 3                   | 3 (#14 to #10)                         |                  |       |               |        |
| HS1410-3-4 |                 |     |                  |     |                              |     | 3                   | 4 (#14 to #10)                         |                  |       |               |        |
| HS1410-4   |                 |     |                  |     |                              |     | 4                   | 4 (#14 to #10)                         |                  |       |               |        |



25 Whaley Avenue, PO Box 310, Milverton  
ON CANADA N0K 1M0  
Tel: 800-561-3164  
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# HS(X)-4XLS SERIES - DELUXE HEAVY DUTY BLACK HEAT SHRINK SPLICE KIT (CSA & UL APPROVED)

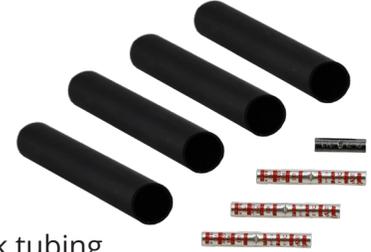
## AWG SIZE # 8 TO #4

### APPLICATIONS:

- Maximum reliability for insulating and protecting power cable connections and terminations.
- Commonly used in electrical, utility and industrial applications, designed for the new smaller O.D. motor lead wires being used on submersible pumps.
- Suitable for applications up to 600 volts.

### FEATURES:

- Seals and protects cable splices and terminations.
- Complete moisture sealing in submersed connections and environmental protection in underground connections.
- High impact, abrasion, corrosion and chemical resistance, highest level of mechanical durability.
- Flame retardant due to the carbon content (carbon black) in the CFW black tubing.



### SPECIFICATIONS:

- Made from CFW black heavy wall adhesive lined cross-linked polyolefin heat shrinkable tubing with a 3:1 shrink ratio.
- Tubing will shrink unrestricted to 33% of it's original diameter, the recovered wall thickness of the tubing is proportional to the degree of recovery.

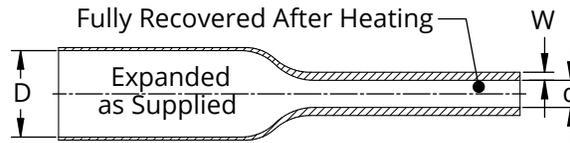
NOTE: Due to the substantial wall thickness, the tubing takes longer to shrink to it's fully recovered state; approx. 40-50 seconds. Time will vary depending on job site conditions and the heat source that is used.

### CERTIFICATIONS:

- Heat Shrink Tubes
  - CSA C22.2 No. 198.2-05; (065789\_0\_000)
  - UL 486D; (E132914)
- RoHS Certified Directive 2002/95/EC<0.10% Pb
- ANSI C119-1
- Western Underground Guide Numbers 2.4 and 2.5
- ICEA and NEMA insulation thickness requirements
- DNV Type approval
- See Page 14 for Stakon certification

### RATINGS:

- Continuous operating temperature -67°F to 230°F (-55°C to 110°C)
- Rated for 1 kV, 90°C continuous use
- Shrink temperature: 248°F (120°C)



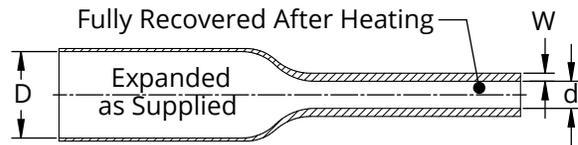
| BLACK DELUXE KIT (Extra Long Stakons) - For #8 AWG Pump Cable, Tubing: HST500-48-BK |                 |       |                  |      |                              |      |                     |   |                 |       |       |               |
|---|-----------------|-------|------------------|------|------------------------------|------|---------------------|---|-----------------|-------|-------|---------------|
| Tube length: 6" (152.4mm)   |                 |       |                  |      |                              |      |                     |   |                 |       |       |               |
| Part No   | Expanded ID (D) |       | Recovered ID (d) |      | Recovered Wall Thickness (W) |      | No. of Shrink Tubes | Number of Stakons (#AWG size) - Part No | Lenth of Stakon |       |       | Stakon Colour |
|   | in              | mm    | in               | mm   | in                           | mm   |                     |   | in              | mm    | mm    |               |
| HS8-4XLS  | 0.51            | 12.95 | 0.16             | 4.06 | 0.09                         | 2.29 | 4                   | 1 (#14 to #10) -SC-14-10                | 13/16           | 0.817 | 20.75 | Silver        |
|   |                 |       |                  |      |                              |      |                     | 3 (#8) - SC-8XLS                        | 2               | 2.000 | 50.80 | Red           |

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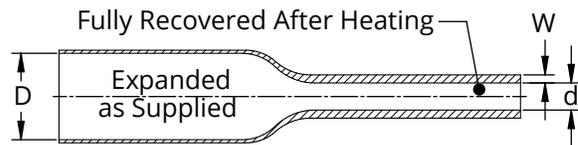
**BLACK DELUXE KIT (Extra Long Stakons) - For #6 AWG Pump Cable, Tubing: HST500-48-BK**  
**Tube length: 6" (152.4mm)**

| Part No  | Expanded ID (D) |       | Recovered ID (d) |      | Recovered Wall Thickness (W) |      | No. of Shrink Tubes | Number of Stakons (#AWG size) - Part no | Lenth of Stakon |       | Stakon Colour |      |
|----------|-----------------|-------|------------------|------|------------------------------|------|---------------------|---|-----------------|-------|---------------|------|
|          | in              | mm    | in               | mm   | in                           | mm   |                     |   | in              | mm    |               |      |
| HS6-4XLS | 0.51            | 12.95 | 0.16             | 4.06 | 0.09                         | 2.29 | 4                   | 3 (#6) - SC-6XLS                        | 2-3/8           | 2.375 | 60.33         | Blue |
|          |                 |       |                  |      |                              |      |                     | 1 (#8) - SC-8XLS                        | 2               | 2.000 | 50.80         | Red  |



**BLACK DELUXE KIT (Extra Long Stakons) - For #4 AWG Pump Cable, Tubing: HST750-48-BK**  
**Tube length: 6" (152.4mm)**

| Part No  | Expanded ID (D) |       | Recovered ID (d) |      | Recovered Wall Thickness (W) |      | No. of Shrink Tubes | Number of Stakons (#AWG size) - Part No | Lenth of Stakon |       | Stakon Colour |      |
|----------|-----------------|-------|------------------|------|------------------------------|------|---------------------|---|-----------------|-------|---------------|------|
|          | in              | mm    | in               | mm   | in                           | mm   |                     |   | in              | mm    |               |      |
| HS4-4XLS | 0.75            | 19.05 | 0.24             | 6.10 | 0.09                         | 2.29 | 4                   | 3 (#4) - SC-4XLS                        | 2-3/8           | 2.395 | 60.83         | Grey |
|          |                 |       |                  |      |                              |      |                     | 1 (#6) - SC-6XLS                        | 2-3/8           | 2.375 | 60.33         | Blue |



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# HS(C) SERIES - HEAVY DUTY HEAT SHRINK KITS (NOT CERTIFIED)

## AWG SIZE #14 TO #4

### APPLICATIONS:

- Maximum reliability for insulating and protecting power cable connections and terminations.
- Commonly used in electrical, utility and industrial applications, designed for the new smaller O.D. motor lead wires being used on submersible pumps.
- Suitable for applications up to 600 volts.

### FEATURES:

- Seals and protects cable splices and terminations.
- Complete moisture sealing in submersed connections and environmental protection.
- High impact, abrasion, corrosion and chemical resistance, highest level of mechanical durability.
- Black tubing is flame retardant due to the carbon content (carbon black) in CFM and CFW black tubing.
- Clear tubing is NOT flame retardant.
- Clear tubing allows for visual inspection of splices, especially helpful for underwater applications to ensure no air pockets remain within the seal.



### SPECIFICATIONS:

- Made from CFM or CFW (indicated in tables) medium or heavy wall adhesive lined cross-linked polyolefin with a 3:1 shrink ratio.
- When heated above 250°F (120°C) tubing shrinks and the adhesive melts to provide a water-tight connection.

NOTE: Due to the substantial wall thickness, the HS(C) series tubing takes longer to shrink to it's fully recovered state; approx. 40-50 seconds. Time will vary depending on job site conditions and the heat source that is used.

### CERTIFICATIONS:

- RoHS Certified Directive 2002/95/EC <0.1% Pb.

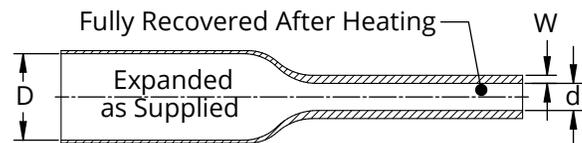


### NOTE:

- These kits not CSA or UL certified.
- Not certified for underground use. For heat shrink kits certified for underground use, see HS1410 & HS(X)-4XLS series on pages 4-5.

### RATINGS:

- Continuous operating temperature -67°F to 230°F (-55°C to 110°C)
- Shrink temperature: 248°F (120°C)



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**HEAVY DUTY SPLICE KITS - For AWG Wire Size #14 to #10**

| Part No  | Expanded ID (D) |       | Recovered ID (d) |      | Recovered Wall Thickness (W) |      | No. of Shrink Tubes | No. of Stakons<br>Part No: SC-14-10 | Stakon Length |       | Stakon Colour |        |
|--|-----------------|-------|------------------|------|------------------------------|------|---------------------|-------------------------------------|---------------|-------|---------------|--------|
|  | in              | mm    | in               | mm   | in                           | mm   |                     |                                     | in            | mm    |               |        |
| <b>Black - Tube length: 3" (76.2mm), Tubing: HST-HS-3-BK (CFM)</b> |                 |       |                  |      |                              |      |                     |                                     |               |       |               |        |
| HS-2   | 0.40            | 10.16 | 0.15             | 3.81 | 0.08                         | 2.03 | 2                   | 2 (#14 - #10)                       | 13/16         | 0.817 | 20.75         | Silver |
| HS-3   |                 |       |                  |      |                              |      | 3                   | 3 (#14 - #10)                       |               |       |               |        |
| HS-3-4   |                 |       |                  |      |                              |      | 3                   | 4 (#14 - #10)                       |               |       |               |        |
| HS-4   |                 |       |                  |      |                              |      | 4                   | 4 (#14 - #10)                       |               |       |               |        |
| <b>Clear - Tube length: 3" (76.2mm), Tubing: HST-HS-3-CL (CFM)</b> |                 |       |                  |      |                              |      |                     |                                     |               |       |               |        |
| HSC-2  | 0.40            | 10.16 | 0.15             | 3.81 | 0.08                         | 2.03 | 2                   | 2 (#14 - #10)                       | 13/16         | 0.817 | 20.75         | Silver |
| HSC-3  |                 |       |                  |      |                              |      | 3                   | 3 (#14 - #10)                       |               |       |               |        |
| HSC-3-4  |                 |       |                  |      |                              |      | 3                   | 4 (#14 - #10)                       |               |       |               |        |
| HSC-4  |                 |       |                  |      |                              |      | 4                   | 4 (#14 - #10)                       |               |       |               |        |



HS-2



HS-3



HS-3-4



HS-4



HSC-2



HSC-3



HSC-3-4



HSC-4

**HEAVY DUTY SPLICE KITS - For AWG Wire Size #8**

| Part No  | Expanded ID (D) |       | Recovered ID (d) |      | Recovered Wall Thickness (W) |      | No. of Shrink Tubes | No. of Stakons<br>(#AWG size) - Part No | Stakon Length |       | Stakon Colour |        |
|--|-----------------|-------|------------------|------|------------------------------|------|---------------------|---|---------------|-------|---------------|--------|
|  | in              | mm    | in               | mm   | in                           | mm   |                     |   | in            | mm    |               |        |
| <b>Black - Tube length: 4.8" (121.9mm), Tubing: HST500-48-BK (CFW)</b> |                 |       |                  |      |                              |      |                     |   |               |       |               |        |
| HS8-3<br>(Disc)  | 0.51            | 12.95 | 0.16             | 4.06 | 0.09                         | 2.29 | 3                   | 2 (#8) - SC-8                           | 7/8           | 0.845 | 21.46         | Silver |
|  |                 |       |                  |      |                              |      |                     | 1 (#14 - #10) -SC-14-10                 | 13/16         | 0.817 | 20.75         |        |
| HS8-4  |                 |       |                  |      |                              |      | 4                   | 3 (#8) - SC-8                           | 7/8           | 0.845 | 21.46         | Silver |
|  |                 |       |                  |      |                              |      |                     | 1 (#14 - #10) -SC-14-10                 | 13/16         | 0.817 | 20.75         |        |
| <b>Clear - Tube length: 4.8" (121.9mm), Tubing: HST750-48-CL (CFM)</b> |                 |       |                  |      |                              |      |                     |   |               |       |               |        |
| HSC8-4   | 0.75            | 19.05 | 0.22             | 5.59 | 0.08                         | 2.03 | 4                   | 3 (#8) - SC-8                           | 7/8           | 0.845 | 21.46         | Silver |
|  |                 |       |                  |      |                              |      |                     | 1 (#14 - #10) -SC-14-10                 | 13/16         | 0.817 | 20.75         |        |



HS8-3



HS8-4



HSC8-4



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ON CANADA N0K 1M0  
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**HEAVY DUTY SPLICE KITS - For AWG Wire Size #6**

| Part No  | Expanded ID (D) |       | Recovered ID (d) |      | Recovered Wall Thickness (W) |      | No. of Shrink Tubes | No. of Stakons (#AWG size) - Part No | Stakon Length |       | Stakon Colour |        |
|--|-----------------|-------|------------------|------|------------------------------|------|---------------------|--------------------------------------|---------------|-------|---------------|--------|
|  | in              | mm    | in               | mm   | in                           | mm   |                     |                                      | in            | mm    |               |        |
| <b>Black - Tube length: 4.8" (121.9mm), Tubing: HST500-48-BK (CFW)</b> |                 |       |                  |      |                              |      |                     |                                      |               |       |               |        |
| HS6-3<br>(Disc)  | 0.51            | 12.95 | 0.16             | 4.06 | 0.09                         | 2.29 | 3                   | 2 (#6) - SC-6                        | 1             | 1.030 | 26.16         | Silver |
|  |                 |       |                  |      |                              |      |                     | 1 (#8) - SC-8                        | 7/8           | 0.845 | 21.46         |        |
| HS6-4  | 0.51            | 12.95 | 0.16             | 4.06 | 0.09                         | 2.29 | 4                   | 3 (#6) - SC-6                        | 1             | 1.030 | 26.16         | Silver |
|  |                 |       |                  |      |                              |      |                     | 1 (#8) - SC-8                        | 7/8           | 0.845 | 21.46         |        |
| <b>Clear - Tube length: 4.8" (121.9mm), Tubing: HST750-48-CL (CFM)</b> |                 |       |                  |      |                              |      |                     |                                      |               |       |               |        |
| HSC6-4   | 0.75            | 19.05 | 0.22             | 5.59 | 0.08                         | 2.03 | 4                   | 3 (#6) - SC-6                        | 1             | 1.030 | 26.16         | Silver |
|  |                 |       |                  |      |                              |      |                     | 1 (#8) - SC-8                        | 7/8           | 0.845 | 21.46         |        |



HS6-3



HS6-4



HSC6-4

**HEAVY DUTY SPLICE KITS - For AWG Wire Size #4**

| Part No  | Expanded ID (D) |       | Recovered ID (d) |      | Recovered Wall Thickness (W) |      | No. of Shrink Tubes | No. of Stakons (#AWG size) - Part No | Stakon Length |       | Stakon Colour |        |
|--|-----------------|-------|------------------|------|------------------------------|------|---------------------|--------------------------------------|---------------|-------|---------------|--------|
|  | in              | mm    | in               | mm   | in                           | mm   |                     |                                      | in            | mm    |               |        |
| <b>Black - Tube length: 4.8" (121.9mm), Tubing: HST750-48-BK (CFW)</b> |                 |       |                  |      |                              |      |                     |                                      |               |       |               |        |
| HS4-4  | 0.75            | 19.05 | 0.24             | 6.10 | 0.09                         | 2.29 | 4                   | 3 (#4) - SC-4                        | 1-1/8         | 1.155 | 29.34         | Silver |
|  |                 |       |                  |      |                              |      |                     | 1 (#6) - SC-6                        | 1             | 1.030 | 26.16         |        |
| <b>Clear - Tube length: 4.8" (121.9mm), Tubing: HST750-48-CL (CFM)</b> |                 |       |                  |      |                              |      |                     |                                      |               |       |               |        |
| HSC4-4   | 0.75            | 19.05 | 0.22             | 5.59 | 0.08                         | 2.03 | 4                   | 3 (#4) - SC-4                        | 1-1/8         | 1.155 | 29.34         | Silver |
|  |                 |       |                  |      |                              |      |                     | 1 (#6) - SC-6                        | 1             | 1.030 | 26.16         |        |



HS4-4



HSC4-4

# HSC(X)-4XLS SERIES - DELUXE CLEAR HEAVY DUTY HEAT SHRINK KITS (NOT CERTIFIED)

## AWG SIZE #8 TO #4

Heat shrink tubing is used to insulate electrical components, like wire, from external factors such as moisture, dust, abrasion, and other objects which could cause damage.

### APPLICATIONS:

- Maximum reliability for insulating and protecting power cable connections and terminations.
- Commonly used in electrical, utility and industrial applications, designed for the new smaller O.D. motor lead wires being used on submersible pumps.
- Suitable for applications up to 600 volts.



### FEATURES:

- Extra long stakons (butt conn) for double crimping.
- Seals and protects cable splices and terminations.
- Complete moisture sealing in submersed connections and environmental protection.
- High impact, abrasion, corrosion and chemical resistance, highest level of mechanical durability.

### SPECIFICATIONS:

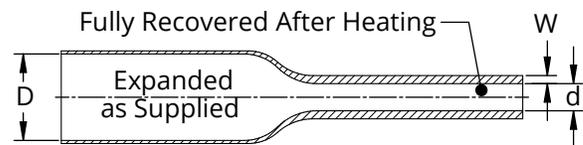
- Made from CFM-750 medium wall clear adhesive lined cross-linked polyolefin heat shrinkable tubing with a 3:1 shrink ratio.
- Tubing will shrink unrestricted to 33% of it's original diameter, the recovered wall thickness of the tubing is proportional to the degree of recovery.

### CERTIFICATIONS:

- RoHS Certified Directive 2002/95/EC <0.1% Pb.

#### NOTE:

- Tubing in these kits is not CSA or UL certified.



| CLEAR DELUXE KIT (Extra Long Stakons) - For #8 AWG Pump Cable, Tubing: HST750-48-CL |                 |       |                  |      |                              |      |                     |                                      |               |       |               |        |
|---|-----------------|-------|------------------|------|------------------------------|------|---------------------|--------------------------------------|---------------|-------|---------------|--------|
| Tube length: 6" (152.4mm)   |                 |       |                  |      |                              |      |                     |                                      |               |       |               |        |
| Part No   | Expanded ID (D) |       | Recovered ID (d) |      | Recovered Wall Thickness (W) |      | No. of Shrink Tubes | No. of Stakons (#AWG size) - Part No | Stakon Length |       | Stakon Colour |        |
|   | in              | mm    | in               | mm   | in                           | mm   |                     |                                      | in            | mm    |               |        |
| HSC8-4XLS   | 0.75            | 19.05 | 0.22             | 5.59 | 0.08                         | 2.03 | 4                   | 1 (#14 to #10) - SC-14-10            | 13/16         | 0.817 | 20.75         | Silver |
|   |                 |       |                  |      |                              |      |                     | 3 (#8) - SC-8XLS                     | 2             | 2.000 | 50.80         | Red    |

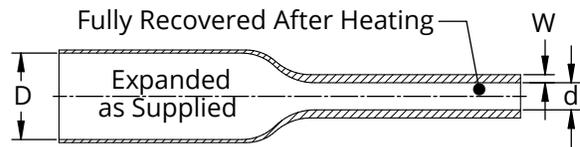
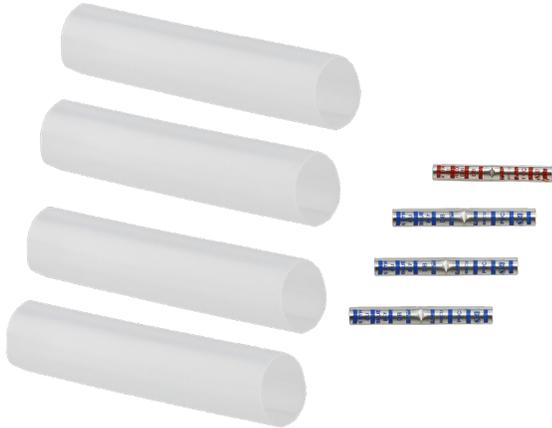


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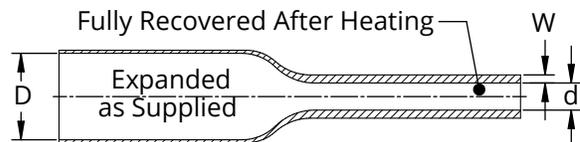
**CLEAR DELUXE KIT (Extra Long Stakons) - For #6 AWG Pump Cable, Tubing: HST750-48-CL**  
**Tube length: 6" (152.4mm)**

| Part No   | Expanded ID (D) |       | Recovered ID (d) |      | Recovered Wall Thickness (W) |      | No. of Shrink Tubes | No. of Stakons (#AWG size) - Part No | Stakon Length |       | Stakon Colour |      |
|-----------|-----------------|-------|------------------|------|------------------------------|------|---------------------|--------------------------------------|---------------|-------|---------------|------|
|           | in              | mm    | in               | mm   | in                           | mm   |                     |                                      | in            | mm    |               |      |
| HSC6-4XLS | 0.75            | 19.05 | 0.22             | 5.59 | 0.08                         | 2.03 | 4                   | 3 (#6) - SC-6XLS                     | 2-3/8         | 2.375 | 60.33         | Blue |
|           |                 |       |                  |      |                              |      |                     | 1 (#8) - SC-8XLS                     | 2             | 2.000 | 50.80         | Red  |



**CLEAR DELUXE KIT (Extra Long Stakons) - For #4 AWG Pump Cable, Tubing: HST750-48-CL**  
**Tube length: 6" (152.4mm)**

| Part No   | Expanded ID (D) |       | Recovered ID (d) |      | Recovered Wall Thickness (W) |      | No. of Shrink Tubes | No. of Stakons (#AWG size) - Part No | Stakon Length |       | Stakon Colour |      |
|-----------|-----------------|-------|------------------|------|------------------------------|------|---------------------|--------------------------------------|---------------|-------|---------------|------|
|           | in              | mm    | in               | mm   | in                           | mm   |                     |                                      | in            | mm    |               |      |
| HSC4-4XLS | 0.75            | 19.05 | 0.22             | 5.59 | 0.08                         | 2.03 | 4                   | 3 (#4) - SC-4XLS                     | 2-3/8         | 2.395 | 60.83         | Grey |
|           |                 |       |                  |      |                              |      |                     | 1 (#6) - SC-6XLS                     | 2-3/8         | 2.375 | 60.33         | Blue |



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# HSKB & HSKC SERIES - KWIK RECOVERY HEAT SHRINK KITS (NOT CERTIFIED)

## AWG SIZE # 14 TO #10

### APPLICATIONS:

- Maximum reliability for insulating and protecting power cable connections and terminations.
- Commonly used in electrical, utility and industrial applications, designed for the new smaller O.D. motor lead wires being used on submersible pumps.
- Suitable for applications up to 600 volts.

### FEATURES:

- Heavy wall tubing provides good impact and abrasion resistance, and highest level of mechanical durability.
- Made from CWWT-450 adhesive lined cross-linked polyolefin heat shrinkable tubing.
- Black tubing is flame retardant due to the carbon content (carbon black) in CWWT-450 black tubing.
- Clear tubing is NOT flame retardant due to removal of carbon content.
- Clear tubing allows for visual inspection of splices. Especially helpful for underwater applications to ensure no air pockets remain within the seal, and for any print on wires to be visible.



### SPECIFICATIONS:

- When heated above 250°F (120°C) the tubing **shrinks rapidly** to a skin tight fit with a 4:1 ratio. Upon cooling, the adhesive solidifies forming a permanent, non-drying, flexible and waterproof barrier.

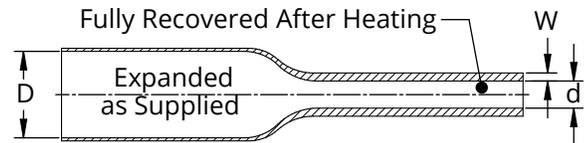
NOTE: This tubing will shrink to it's fully recovered diameter in approx. 25-30 seconds. Time will vary depending on job site conditions and the heat source that is used.

### CERTIFICATIONS:

- RoHS Certified Directive 2002/95/EC <0.1% Pb.

NOTE:

- Tubing in these kits is not CSA or UL certified.



### BLACK KWIK RECOVERY HEAT SHRINK KITS - For AWG Wire Size #14 to #10 - Tubing: HST-HSK-3-BK Tube length: 3" (76.2mm)

| Part No  | Expanded ID (D) |      | Recovered ID (d) |     | Recovered Wall Thickness (W) |      | No. of Shrink Tubes | No. of Stakeons Part No: SC-14-10 | Stakon Length |       | Stakon colour |        |
|----------|-----------------|------|------------------|-----|------------------------------|------|---------------------|-----------------------------------|---------------|-------|---------------|--------|
|          | in              | mm   | in               | mm  | in                           | mm   |                     |                                   | in            | mm    |               |        |
| HSKB-2   | 0.41            | 10.5 | 0.10             | 2.6 | 0.043                        | 1.09 | 2                   | 2 (#14 - #10)                     | 13/16         | 0.817 | 20.75         | Silver |
| HSKB-3   |                 |      |                  |     |                              |      | 3                   | 3 (#14 - #10)                     |               |       |               |        |
| HSKB-3-4 |                 |      |                  |     |                              |      | 3                   | 4 (#14 - #10)                     |               |       |               |        |
| HSKB-4   |                 |      |                  |     |                              |      | 4                   | 4 (#14 - #10)                     |               |       |               |        |



HSKB-2



HSKB-3



HSKB-3-4



HSKB-4

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**CLEAR KWIK RECOVERY HEAT SHRINK KITS - For AWG Wire Size #14 to #10 - Tubing: HST-HSK-3-CL  
Tube length: 3" (76.2mm)**

| Part No  | Expanded ID (D) |      | Recovered ID (d) |     | Recovered Wall Thickness (W) |      | No. of Shrink Tubes | No. of Stakeons Part No: SC-14-10 | Stakon Length |       | Stakon colour |        |
|----------|-----------------|------|------------------|-----|------------------------------|------|---------------------|-----------------------------------|---------------|-------|---------------|--------|
|          | in              | mm   | in               | mm  | in                           | mm   |                     |                                   | in            | mm    |               |        |
| HSKC-2   | 0.41            | 10.5 | 0.10             | 2.6 | 0.043                        | 1.09 | 2                   | 2 (#14 - #10)                     | 13/16         | 0.817 | 20.75         | Silver |
| HSKC-3   |                 |      |                  |     |                              |      | 3                   | 3 (#14 - #10)                     |               |       |               |        |
| HSKC-3-4 |                 |      |                  |     |                              |      | 3                   | 4 (#14 - #10)                     |               |       |               |        |
| HSKC-4   |                 |      |                  |     |                              |      | 4                   | 4 (#14 - #10)                     |               |       |               |        |
| HSKC-12  |                 |      |                  |     |                              |      | 12                  | 12 (#14 - #10)                    |               |       |               |        |



HSKC-2



HSKC-3



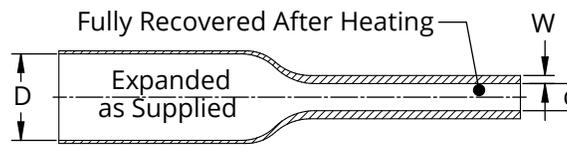
HSKC-3-4



HSKC-4



HSKC-12



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# HST(XXXX)-48-BK & HST-HS1410-3-BK SERIES - BLACK HEAT SHRINK TUBING (CSA & UL APPROVED) AWG SIZE #19 TO #350

HST(XXXX)-48-BK tubing is 48" lengths that can be cut to desired size, not sold in a kit.  
HST-HS1410-3-BK is available in 3" long tubes bulk package of 25 pieces.

## APPLICATIONS:

- Maximum reliability for insulating and protecting power cable connections and terminations.
- Commonly used in electrical, utility and industrial applications, designed for the new smaller O.D. motor lead wires being used on submersible pumps.
- Suitable for applications up to 600 volts.

## FEATURES:

- Seals and protects cable splices and terminations.
- Complete moisture sealing in submersed connections and environmental protection in underground connections.
- High impact, abrasion, corrosion and chemical resistance.
- Flame retardant due to the carbon content (carbon black) in CFW black tubing.

## SPECIFICATIONS:

- Made from CFW heavy wall black adhesive lined cross-linked polyolefin heat shrinkable tubing with a 3:1 shrink ratio.

NOTE: Due to the substantial wall thickness, the tubing takes longer to shrink to it's fully recovered state; approx. 40-50 seconds. Time will vary depending on job site conditions and the heat source that is used.

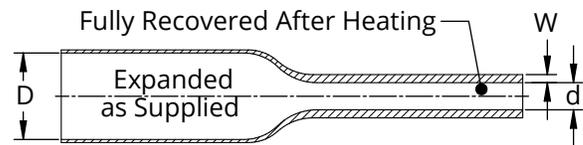
## CERTIFICATIONS:

- Heat Shrink Tubes
  - CSA C22.2 No. 198.2-05; (065789\_0\_000)
  - UL 486D; (E132914)
- RoHS Certified Directive 2002/95/EC<0.10% Pb
- ANSI C119-1
- Western Underground Guide Numbers 2.4 and 2.5
- ICEA and NEMA insulation thickness requirements
- DNV Type approval



## RATINGS:

- Continuous operating temperature -67°F to 230°F (-55°C to 110°C)
- Rated for 1 kV, 90°C continuous use
- Shrink temperature: 248°F (120°C)



| CSA & UL Approved BLACK 48" LENGTH HEAT SHRINK TUBING - Tubing: CFW |                 |      |                  |      |               |             |        |                              |      |
|---|-----------------|------|------------------|------|---------------|-------------|--------|------------------------------|------|
| Part No   | Expanded ID (D) |      | Recovered ID (d) |      | AWG Wire Size | Tube Length |        | Recovered Wall Thickness (W) |      |
|   | in              | mm   | in               | mm   |               | in          | mm     | in                           | mm   |
| HST350-48-BK*   | 0.35            | 8.9  | 0.12             | 3.0  | #14 to #19    | 48          | 1219.2 | 0.07                         | 1.78 |
| HST500-48-BK**  | 0.51            | 13.0 | 0.16             | 4.1  | #8 to #6      |             |        | 0.08                         | 2.03 |
| HST750-48-BK◇   | 0.75            | 19.1 | 0.24             | 6.1  | #6 to #2      |             |        | 0.12                         | 3.05 |
| HST1100-48-BK   | 1.10            | 27.9 | 0.35             | 8.9  | #1 to #3/0    |             |        | 0.12                         | 3.05 |
| HST1500-48-BK   | 1.50            | 38.1 | 0.47             | 11.9 | #2-0 to #350  |             |        | 0.14                         | 3.56 |

\*Used in HST-HS1410-3-BK 2" bulk packages of 25 pieces, & HS1410-(X) Heavy Duty Standard Kits

\*\*HS6 & HS8 Kits, HS8-4XLS & HS6-4XLS Deluxe Kits

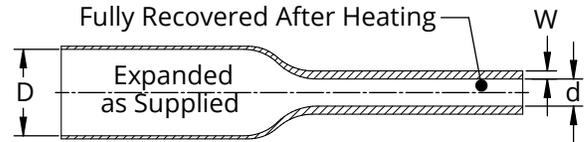
◇HS4-4XLS Deluxe Kits

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**CSA & UL Approved BLACK HEAT SHRINK TUBING - For AWG Wire Size #14 to #10**

| Part No  | Expanded ID (D) |     | Recovered ID (d) |     | Tube Length |      | Recovered Wall Thickness (W) |     |
|--|-----------------|-----|------------------|-----|-------------|------|------------------------------|-----|
|  | in              | mm  | in               | mm  | in          | mm   | in                           | mm  |
| <b>Black Heavy Duty - Tubing: CFW 350 (3" tubes in bulk package of 25)</b> |                 |     |                  |     |             |      |                              |     |
| HST-HS1410-3-BK*   | 0.35            | 8.9 | 0.12             | 3.0 | 3           | 76.2 | 0.07                         | 1.8 |
| *Used in HS1410 Kits   |                 |     |                  |     |             |      |                              |     |



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# HST(XXX)-48 & HST-HS(K)-3 SERIES - HEAT SHRINK TUBING (NON CERTIFIED) AWG SIZE #14 TO #2

These products are available in 48" lengths that can be cut to desired size, not sold in a kit, or available in 3" long tubes bulk package of 25 pieces.

## APPLICATIONS:

- Maximum reliability for insulating and protecting power cable connections and terminations.
- Commonly used in electrical, utility and industrial applications, designed for the new smaller O.D. motor lead wires being used on submersible pumps.
- Suitable for applications up to 600 volts.

## FEATURES:

- Seals and protects cable splices and terminations.
- Complete moisture sealing and environmental protection.
- High impact, abrasion, corrosion and chemical resistance, strain relief for delicate wire connections.
- Black tubing is flame retardant due to the carbon content (carbon black) in CFM black tubing.
- Clear tubing is NOT flame retardant.
- Clear tubing allows for visual inspection of splices. Especially helpful for underwater applications to ensure no air pockets remain within the seal, and for any print on wires to be visible.



## SPECIFICATIONS:

- HST(XXX)-48 and HST-HS-3 Tubing made is from CFM medium wall adhesive lined cross-linked polyolefin heat shrinkable tubing with a 3:1 shrink ratio.
- HST-HSK-3 Tubing is made from CWWT-450 400 thin wall adhesive lined cross-linked polyolefin heat shrinkable tubing with a 4:1 shrink ratio.

NOTE: Due to the substantial wall thickness, the HST(XXX)-48 and HST-HS-3 series tubing takes longer to shrink to it's fully recovered state; approx. 40-50 seconds. The HST-HSK-3 tubing will **shrink rapidly** to it's fully recovered diameter in 25-30 seconds. Time will vary depending on job site conditions and the heat source that is used.

## CERTIFICATIONS:

- RoHS Certified Directive 2002/95/EC<0.10% Pb

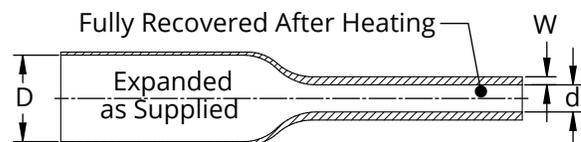


## NOTE:

- This tubing not CSA or UL certified.

## RATINGS:

- Continuous operating temperature -67°F to 230°F (-55°C to 110°C)
- Shrink temperature: 248°F (120°C)



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| BLACK HEAT SHRINK TUBING - For AWG Wire Size #14 To #10 (3" tubes are in bulk package of 25)                 |                 |       |                  |      |                    |      |             |        |
|--|-----------------|-------|------------------|------|--------------------|------|-------------|--------|
| Part No  | Expanded ID (D) |       | Recovered ID (d) |      | Wall Thickness (W) |      | Tube Length |        |
|  | in              | mm    | in               | mm   | in                 | mm   | in          | mm     |
| <b>Black Heavy Duty - 3" tubes are in bulk package of 25 - Tubing: CFM 400 (3:1 shrink ratio)</b>            |                 |       |                  |      |                    |      |             |        |
| HST-HS-3-BK*   | 0.40            | 10.16 | 0.15             | 3.81 | 0.08               | 2.03 | 3           | 76.2   |
| HST400-48-BK   | 0.40            | 10.16 | 0.15             | 3.81 | 0.08               | 2.03 | 48          | 1219.2 |
| <b>Black Kwik Recovery - 3" tubes are in bulk package of 25 - Tubing: CWWT-450 400 (4:1 shrink ratio)</b>    |                 |       |                  |      |                    |      |             |        |
| HST-HSK-3-BK**   | 0.41            | 10.5  | 0.10             | 2.6  | 0.043              | 1.09 | 3           | 76.2   |
| * Used in Non Certified HS Heavy Duty Kits for AWG Wire Size #14 to #10 ** Used in HSK(B) Kwik Recovery Kits |                 |       |                  |      |                    |      |             |        |



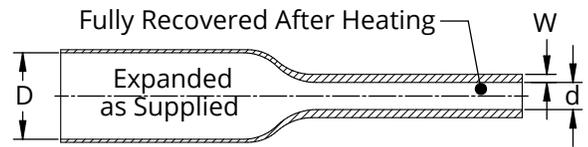
HST-HS-3-BK



HST400-48-BK



HST-HSK-3-BK



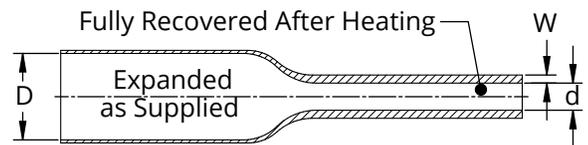
| CLEAR HEAT SHRINK TUBING - For AWG Wire Size #14 To #10 (3" tubes are in bulk package of 25)      |                 |       |                  |      |                    |      |             |        |
|---|-----------------|-------|------------------|------|--------------------|------|-------------|--------|
| Part No   | Expanded ID (D) |       | Recovered ID (d) |      | Wall Thickness (W) |      | Tube Length |        |
|   | in              | mm    | in               | mm   | in                 | mm   | in          | mm     |
| <b>Clear Heavy Duty - 3" tubes are in bulk package of 25 - Tubing: CFM 400 (3:1 shrink ratio)</b> |                 |       |                  |      |                    |      |             |        |
| HST-HS-3-CL*  | 0.40            | 10.16 | 0.15             | 3.81 | 0.08               | 2.03 | 3           | 76.2   |
| HST400-48-CL  | 0.40            | 10.16 | 0.15             | 3.81 | 0.08               | 2.03 | 48          | 1219.2 |
| *Used in Non Certified HSC Heavy Duty Kits for AWG Wire Size #14 to #10                           |                 |       |                  |      |                    |      |             |        |



HST-HS-3-CL

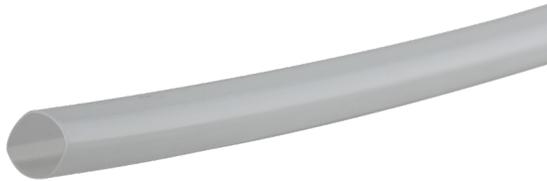


HST400-48-CL

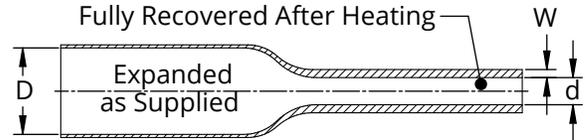


**CLEAR HEAT SHRINK TUBING - For AWG Wire Size #8 to #2**

| Part No  | Expanded ID |       | Recovered ID |      | Wall Thickness |      | Tube Length |        |
|--|-------------|-------|--------------|------|----------------|------|-------------|--------|
|  | in          | mm    | in           | mm   | in             | mm   | in          | mm     |
| <b>Clear Heavy Duty - Tubing: CFM 750 (3:1 shrink ratio)</b> |             |       |              |      |                |      |             |        |
| HST750-48-CL*  | 0.75        | 19.05 | 0.22         | 5.59 | 0.08           | 2.03 | 48          | 1219.2 |
| *Used in HSC(X) Standard and HSC(X)-4XLS Deluxe Kits         |             |       |              |      |                |      |             |        |



HST750-48-CL



# SC SERIES - STAKON CONNECTORS

## AWG SIZE #14 TO #8

Stakons are used to connect electrical components, like wire, and are then crimped to keep the connection secure. The appropriate heat shrink tubing is then used over the stakon to insulate and seal the connection.

### APPLICATIONS:

- Maximum reliability for insulating and protecting power cable connections and terminations.
- Commonly used in electrical, utility and industrial applications, designed for the new smaller O.D. motor lead wires being used on submersible pumps.
- Suitable for applications up to 600 volts.

### FEATURES:

- Connects and seals cable splices and terminations.
- Deluxe stakons are extra-long for double crimping.
- Beveled entry for easy cable insertion.
- Center dimple to ensure wire does not reach over center, or inserted too far. This also ensures maximum contact and tensile strength after crimping.

### SPECIFICATIONS:

- Lead Free
- Seamless Copper, Electro-Tin Plating

### CERTIFICATIONS:

- SC-14-10 Stakons:
  - CSA C22.2 No. 150; (018689\_C\_000)
  - UL 486D; (E32244)
- SC-(X)XLS Stakons:
  - CSA C22.2 No. 65; (023769\_0\_000)
  - UL 486D; (E12822)
- RoHS Certified Directive 2002/95/EC<0.10% Pb



### RATINGS:

- Continuous operating temperature -67°F to 230°F (-55°C to 110°C)

| CSA & UL Approved - (Long) STAKON SPECIFICATIONS |                 |                        |       |                  |       |       |        |
|--|-----------------|------------------------|-------|------------------|-------|-------|--------|
| Part No  | AWG Wire Size   | Max Wire Diameter (ID) |       | Length of Stakon |       |       | Colour |
|  |                 | in                     | mm    | in               | mm    | mm    |        |
| SC-14-10   | #14, #12, & #10 | 0.145                  | 3.683 | 13/16            | 0.817 | 20.75 | Silver |

| CSA & UL Approved - DELUXE (Extra Long) STAKON SPECIFICATIONS |               |                        |       |                  |       |       |        |
|---|---------------|------------------------|-------|------------------|-------|-------|--------|
| Part No   | AWG Wire Size | Max Wire Diameter (ID) |       | Length of Stakon |       |       | Colour |
|   |               | in                     | mm    | in               | mm    | mm    |        |
| SC-8XLS   | #8            | 0.146                  | 3.708 | 2                | 2.000 | 50.80 | Red    |
| SC-6XLS   | #6            | 0.173                  | 4.394 | 2-3/8            | 2.375 | 60.33 | Blue   |
| SC-4XLS   | #4            | 0.245                  | 6.223 | 2-3/8            | 2.395 | 60.83 | Grey   |
| SC-2XLS   | #2            | 0.306                  | 7.772 | 2-5/8            | 2.634 | 66.90 | Brown  |



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NOTE: Standard (Short Pattern) Stakons are not CSA or UL approved.

| STANDARD (Short Pattern) STAKON SPECIFICATIONS |               |                        |       |                  |       |       |        |
|--|---------------|------------------------|-------|------------------|-------|-------|--------|
| Part No  | AWG Wire Size | Max Wire Diameter (ID) |       | Length of Stakon |       |       | Colour |
|  |               | in                     | mm    | in               | mm    | mm    |        |
| SC-8   | #8            | 0.172                  | 4.369 | 7/8              | 0.845 | 21.46 | Silver |
| SC-6   | #6            | 0.225                  | 5.715 | 1                | 1.030 | 26.16 |        |
| SC-4   | #4            | 0.300                  | 7.620 | 1-1/8            | 1.155 | 29.34 |        |
| SC-2   | #2            | 0.367                  | 9.322 | 1-1/4            | 1.265 | 32.13 |        |



SC-8



SC-6



SC-4



SC-2

## TOOLS & APPLICATION GUIDE:

### What can be used to shrink down heat shrink tubing?

Our heat shrink tubing is made from polyolefin material and begins to shrink at approximately 194°F (90°C) to 248°F (120°C). Various heat sources can be used to shrink heat shrink tubing to its final size. It is recommended to use a heat gun where there is access to a 115-volt power source. Outdoors, where electricity may not be readily available, a battery powered heat gun is the best option. Alternatively, a butane or propane torch will work.

**CAUTION:** When using an open flame it must be done with great care and caution. Although the black tubing itself is designed to be flame retardant, due to carbon content in black tubing only, the wires themselves are not. Even a lighter can be used in a pinch, but it is NOT recommended.

A hair dryer will eventually cause the tubing to shrink, however will not achieve full shrinkage of the tubing and should be avoided in this application.



### Direct Burial Application

Boshart's Black or Clear Adhesive Lined Heat Shrink Tubing can and has been used for direct burial application as there are no flammability issues with a buried connection. Black tubing is flame retardant and should be used to make splices in all above ground electrical cable splicing applications. If abrasion resistance is a concern the installer may want to add an additional 2-3 layers of 8mm electrical tape (Boshart Part Number: ETCWNL) to cover the splice connections for peace of mind, but this is optional. For direct burial applications you must use CFW heavy wall tubing certified to Western Underground Guide Numbers 2.4 and 2.5.

**CAUTION:** The installation must always be in compliance with all applicable national and local electrical codes for the area where the installation is made. If in doubt it is best to reach out to your local electrical inspector. The AHJ (Authority Having Jurisdiction) responsible for the project and enforcing codes, standards, and regulations related to construction and safety, always has the final say on a product or materials suitability.

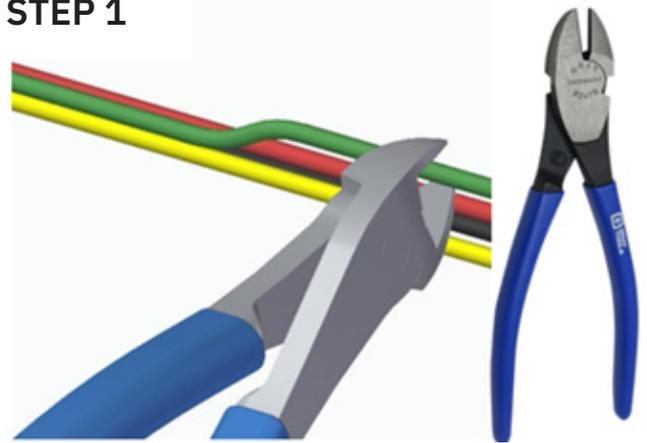


# INSTALLATION - Submersible pump cable splicing instructions:

## STEP 1

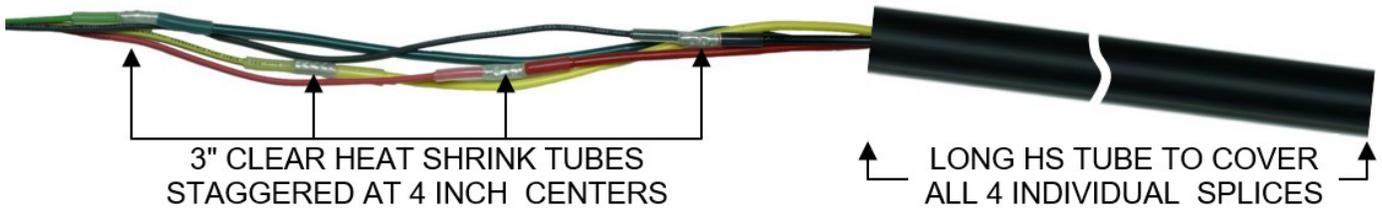
Use side cutting pliers to cut the motor leads and pump cable to proper length in a staggered pattern. Ensure that the connections are not all in one short section which would result in a very bulky connection that will increase the risk of excessive abrasion against the well casing as the pump is lowered down the well.

## STEP 1

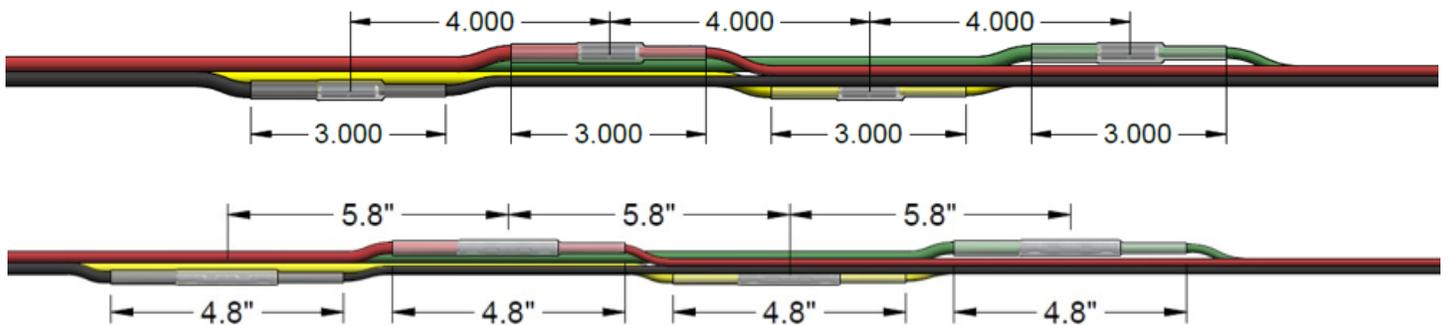


## Staggered Splicing

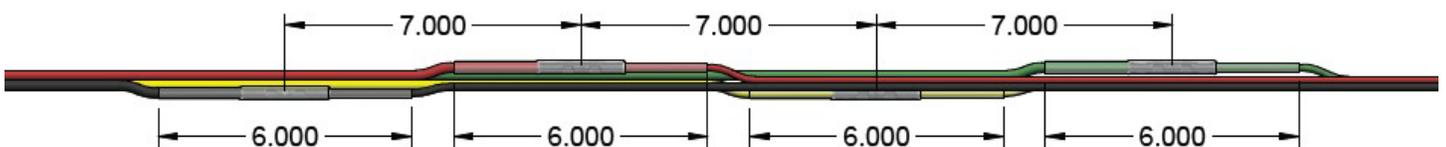
It is best practice to stagger the splice connections to reduce the risk of bulky wire connections which are more prone to damage during pump installation.



When making splices with 3" heat shrink tubes, cut the motor leads / pump cable at a minimum of 4" intervals for each color of conductor to provide a small gap between the heat shrink tubes as shown in the 3" tube staggered pattern diagram below. For 4.8" heat shrink tubes, cut the motor leads/ pump cable at a minimum of 5.8" intervals.



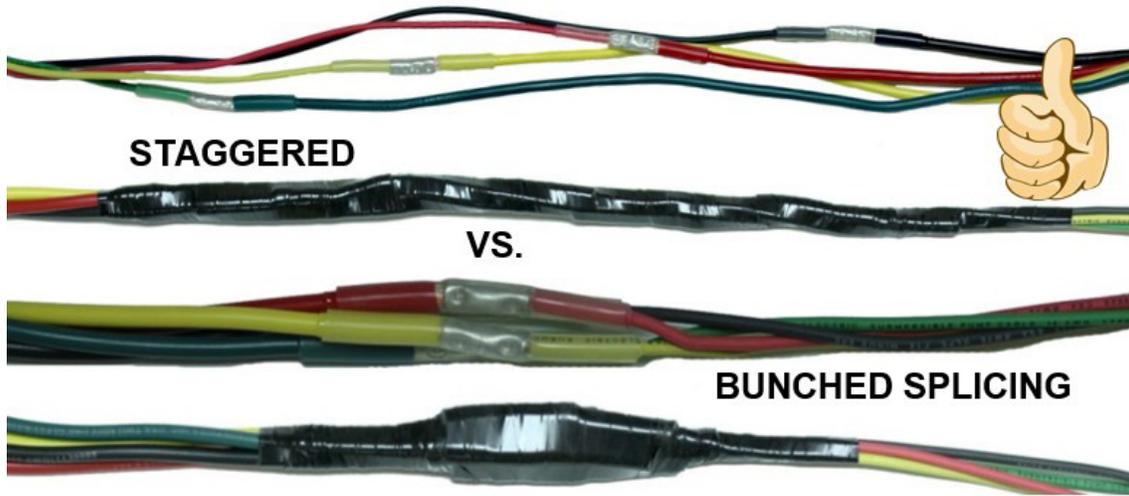
For installations using the Deluxe -XLS Extra Long Stakon heat shrink kits with 6" heat shrink tubes, cut the motor leads / pump cable at a minimum of 7" intervals for each color of conductor to provide a small gap between the heat shrink tubes as shown in the 6" tube staggered pattern diagram below.



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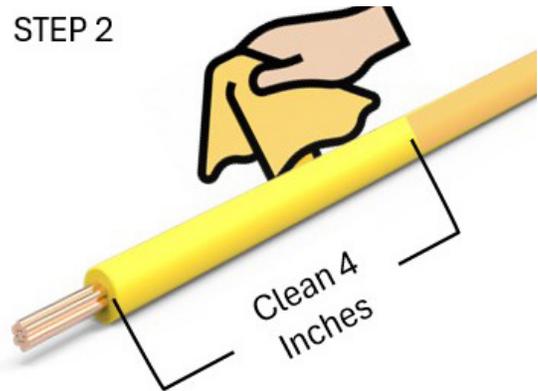




**STEP 2**

Clean the insulation for a minimum of 4 inches on all cable & motor lead wires to ensure any dirt, grease or other foreign debris is removed. This will provide a dry, clean surface for the adhesive lining of the heat shrink tube to adhere and provide a watertight seal for the submersed connections.

**STEP 2**

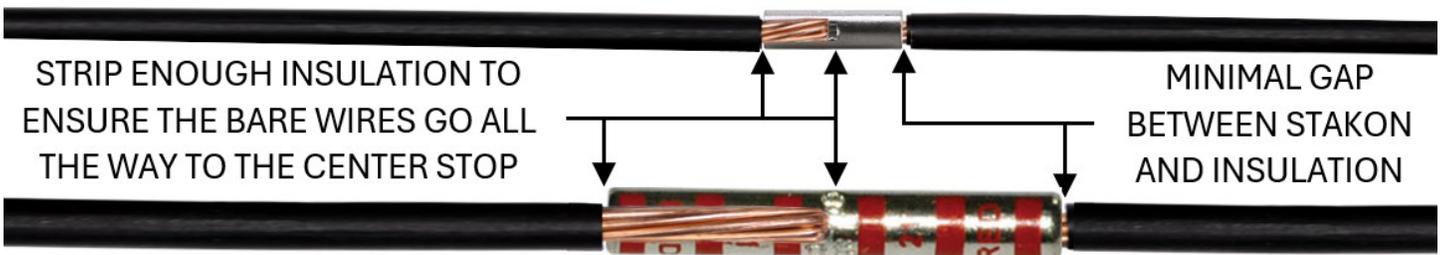


**STEP 3**

Remove insulation from the pump cable & motor lead wires. To make a secure connection the wires must be inserted all the way to the stop in the center of the stakon connector. Do not force the wires past the stop!

With the copper wires against the stop the insulation should be very close to or touching the connector. Do not leave a wide gap between the insulation and the stakon connector.

**STEP 3**



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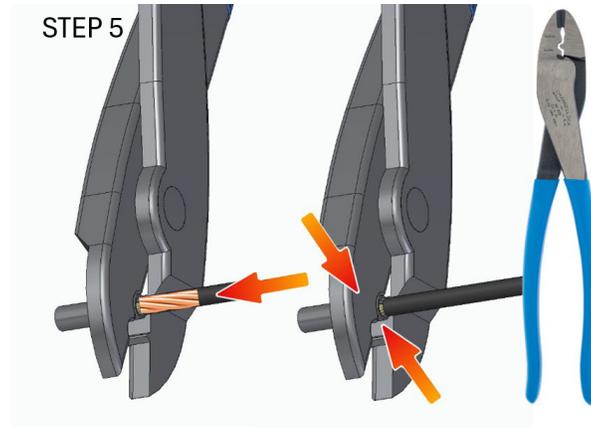
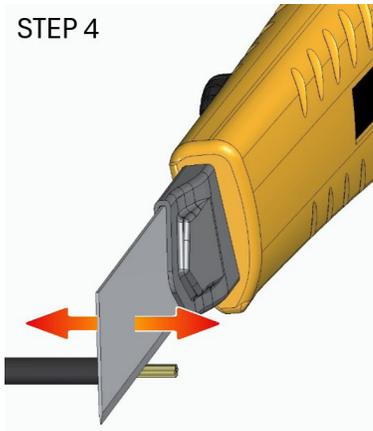
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## STEP 4

Scrape copper to a “bright” finish to remove any oxidization and to ensure the wires are clean and free of any foreign debris to optimize conductivity between the wires and the stakon connector.

## STEP 5

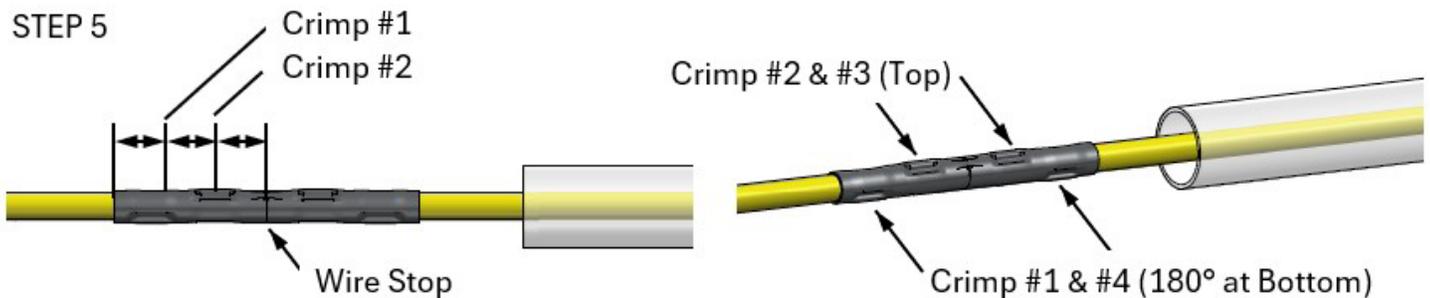
Insert the stripped motor lead wires into the stakon connector and crimp the stakon to the motor lead using a proper crimping tool. Repeat for each motor lead. Three connections (BRG) for 2 wire pumps and four connections (BRYG) for 3 wire pumps. Short stakon connectors only have room to make a single crimp on each end of the connector.



### X-Long Stakon Crimping Tip:

On the Extra-Long connectors, you can fit a second crimp on each end (total of four crimps per connector).

Crimp the wire in in two places, equally spaced between the center wire stop and the end of the stakon connector. Make the first crimp at the top and the second crimp at 180° degrees (Bottom). The opposing crimps press the wire firmly against the interior wall on the opposite side of the connector, creating a secure, pull-out resistant connection when done correctly.



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## STEP 6:

Slide the shrink tubes over one end of the pump cable or motor lead. **Do not forget to do this before making your second crimp connection on the stakon.**



**TIP:** If you want to provide additional abrasion resistance by shrinking a long length of large diameter heat shrink tube over all the connections at the end of the splicing procedure rather than using electrical tape, **you must install it at this time** sliding it up the pump cable, out of the way for the time being.



This is the time to slide the long larger diameter heat shrink tube over all the wires, if you plan to shrink an additional jacket over all the individual connections for added abrasion resistance!

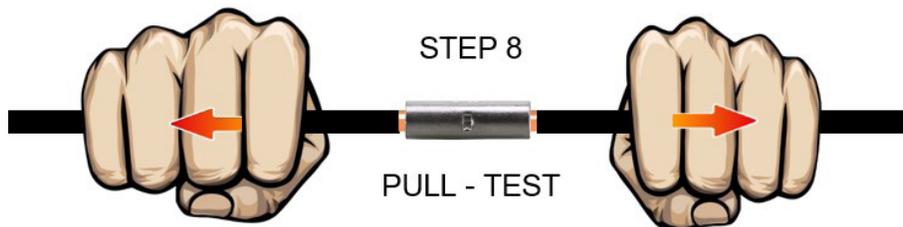
## STEP 7:

Insert the stripped pump cable into the opposite end of the stakon connector, making sure to match the color-coded wires and crimp the stakon securely to the pump cable.



## STEP 8:

Make sure to pull lightly on each connection to test the crimp connections.



## PULL-OUT PREVENTION TIP:

Soldering the wires into the connector provides maximum conductivity, ensuring consistent electrical connections that maintain their integrity over time, ensuring the longevity and reliability. In addition, soldering eliminates the risk of the wires pulling out of the stakon connector due to a poor crimp. This step provides cheap insurance against unnecessary call backs in the event a poor or failed crimp connection.



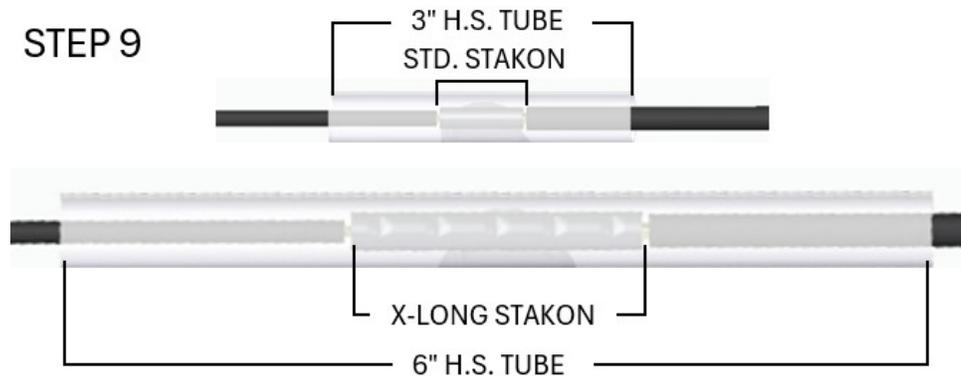
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## STEP 9:

Slide the heat shrink tube over the stakon connector. It is very important to centre the heat shrink tube over the connector to ensure equal sealing area on each side of the splice. Clear heat shrink tubing allows for a quick and easy visual inspection.



## STEP 10-A:

Apply low heat with a heat gun (preferable) or a torch to the shrink tube. It is critical to start in the center of the tube applying the heat evenly around the circumference of the tube until it is fully shrunk to the fully recovered diameter and starts forcing the adhesive to flow from the center towards both ends.

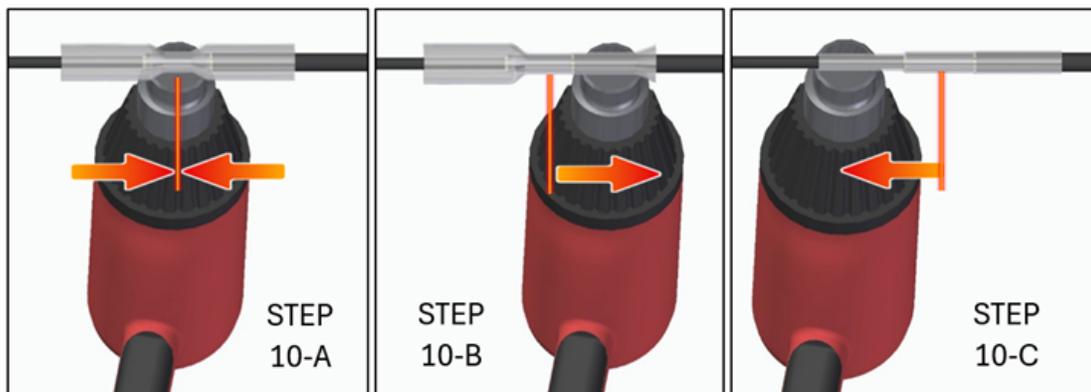
## STEP 10-B:

Continue applying heat from the centre, out towards one end, rotating the wire to apply heat around the entire diameter. Move at a slow steady pace making sure that you do not get trapped air bubbles. It is crucial that the shrinking tube and melted adhesive forces all the air out of the tube as the heat is applied to the tubing.

## STEP 10-C:

Repeat the process again applying heat from the centre, out towards the opposite end.

This will ensure a watertight seal that is free from any trapped air bubbles, which could potentially cause moisture to creep in and cause a short. Again, clear heat shrink tubing allows for a visual inspection during the shrink procedure to ensure that no air bubbles are getting trapped.



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## STEP 11:

Inspect each connection. When completely sealed, a small bead of adhesive glue will be forced out and should be visible around the wire at each end of the heat shrink tube. Allow connections to cool a few minutes before installing the pump.

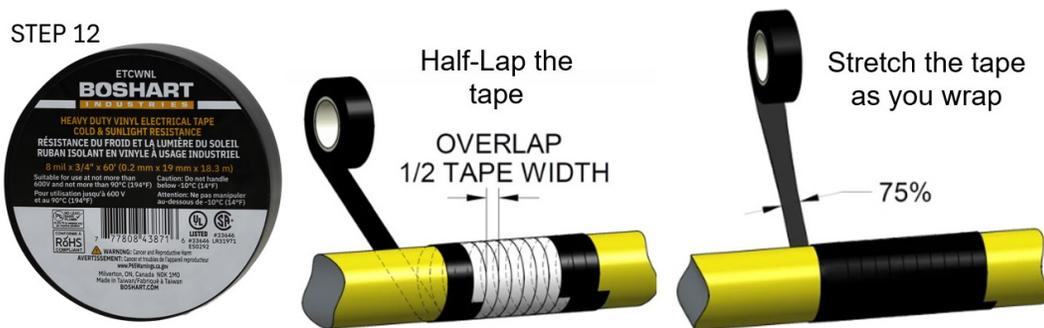


## STEP 12:

To provide additional abrasion protection to the splice connections, the application of multiple layers of electrical tape around the entire length of the splices can be highly effective.

**TIP #1 HALF WRAP** - Proper application of electrical tape is to half-lap, as shown in the diagram below, which results in a double layer of tape. The rule of thumb is to do a minimum of two half-lapped layers or one and a half times the thickness of the insulation of the wire that you are wrapping, whichever is greater. The tape should be thicker than the insulation, for added protection.

**TIP#2 STRETCH TAPE AS YOU WRAP** - Electrical tape works the best when it adapts to the object it is being applied to. When you go to apply your electrical tape to a cord or piece of wire, you should stretch the tape as you wrap. When the tape is stretched as its being applied, it will provide more insulation protection than when it is applied loosely. To create an effective insulation, you should wrap the tape between 75% of it's width to right before the breaking point. Doing this will ensure the tape will be able to withstand the elements. The last wrap should be applied with no tension to prevent flagging.



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